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Journal of the Society of Arts.

FRIDAY, MAY 2, 1856.

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TWENTIETH ORDINARY MEETING,

Wednesday, April 30, 1856.

The Twentieth Ordinary Meeting of the One Hundred and Second Session was held on Wednesday, the 30th inst., A. Salomons, Esq., in the Chair.

The following Candidates were balloted for, and duly elected Ordinary Members:—

Carr, Anthony.
Drury, Mark Henry.
Fowler, Robert Nicholas.
Henley, Thomas L.
Sandon, Lord Viscount.
Simons, George.
Stenhouse, John, LL.D., F.R.S.

The paper read was—

ON THE PRINTING OF FABRICS, WITH SPECIAL REFERENCE TO SHAWLS AND CARPETS.

By Joseph Burch.

Into the origin and practice of the art of calico printing in ancient times it is not my province to enter. Indeed, the materials for that purpose are too scanty to afford any definite or reliable basis on which to build up a history of the art. I may, however, mention that, in India, the art of calico printing appears to have been practised from time immemorial with considerable success.

The large cotton pallampoors, or chintz counterpanes, manufactured in the East Indies, were first painted by the brush, with dye-absorbing mordants; the colours were then raised, and the material was afterwards dyed blue with indigo, the design being protected by a covering of soft wax, which was also applied with a pencil, and was easily cleaned off, after the dyeing process, by washing.

With the permission of the meeting, I will give a short extract from Pliny, because it has a bearing on some of the modern processes which I shall refer to in a subsequent part of my paper:—"Robes and white veils are painted in a very wonderful way; they are first imbued, not with colours, but with dye-absorbing drugs, by which afterwards, though they seem to be unaltered, yet, when immersed in a boiling cauldron for a specified time, they are found to become painted. Yet it is very marvellous that, from one colour only in the cauldron, many should appear on the robe, in consequence of the absorbing influence of the drug; yet from it the cloth acquires different colours of a permanent nature, which cannot afterwards be removed by any process of washing. The colours of cloths prepared in this manner are always more durable than if they were not dipped in the boiling cauldron, which, although it would of itself appear merely to confuse the colours of cloths previously dyed, is thus made to impart several distinct colours from one dye-stuff, the painting process successfully proceeding while the cauldron boils."

Before going any further, it perhaps will be as well to clear up this mystery of Pliny's, by explaining that the dye-absorbing drugs which he mentions are now known as the mordants, and that, according to the chemical nature of the mordants, so the colouring matter of madder is varied. Thus blacks, and the intermediate tints of purples to lilacs, are produced from acetate of iron mordants of various strengths; dark reds, pale reds, and pinks, are produced from acetate of alum; and a mixture of the two mordants produces chocolate colours. Therefore, if a piece of calico be printed with these mordants in strengths differing in proportion to the varying shades of the design, so the colours will appear thereon as they are gradually raised in the madder beck, or cauldron, which contains madder dye.

Augsburg became celebrated for its prints about the close of the seventeenth century, and from that city the art migrated to Alsace and Switzerland. Into England, where, by the aid of mechanical and chemical science combined, the greatest development of the art was destined to take place, it did not find its way until about the year 1690, when a small print factory was established on the banks of the Thames, near Richmond, by a Frenchman, whom some writers suppose to have been a refugee, after the Revocation of the Edict of Nantes. The success of the first attempt, which was materially advanced and encouraged by the prohibitory legislative enactment against the importation of the Indian chintzes, soon aroused a spirit of enterprise, and a more extensive concern was established at Bromley Hall, on the Lea, and as the demand for these productions increased, similar establishments were erected on the banks of the Wandle and other streams in the suburban districts of London, a supply of pure water being indispensable for carrying on the process. Here this newly-imported art took root, and flourished, and it was confined to this locality for upwards of half-a-century, London being the principal market for the sale of the new manufacture.

The prohibition against the importation of the Indian chintz did not extend to the white linen cloth, which continued to be admitted into this country on payment of a duty. It was an expensive but very durable material, manufactured from fine flax, and has been sold, when printed, at upwards of a guinea per yard, half that price being paid by the merchant to the printer for printing it. While the demand continued to exceed the supply, but few attempts were made to cheapen the process, the most elaborate chintz styles being generally finished with the brush, by young females, called pencillers, who afterwards dotted upon the cloth those colours which could not be obtained from the madder dye.

At this period of calico-printing the process was performed, and the effects produced, from wood engraved blocks, which art, as applied to calico-printing, had then reached perfection. Box-wood was used for the outlines, which were in reality works of art, often requiring, perhaps, three or four months for the completion of a single block. Specimens of these blocks are still preserved, most elaborately and beautifully cut, the perfection of which in the present day the work-people cannot rival, as this expensive process has been superseded by less costly methods. Single coloured designs on cloth were also produced soon afterwards, by a machine, from flat engraved copper-plates, and also by a surface roller printing machine, called a "Snivy;" and, in the absence of a more refined method, at this time a very simple contrivance was adopted fer printing stripes. It consisted in the use of a wooden trough, with a thin metal bottom, which was perforated with holes at certain distances apart, corresponding in size and regularity with the stripes in the design to be produced. This trough was pressed parallel with its axis on a wooden drum, covered with a soft material, and made to revolve by means of a handle. The calico, after being carefully rolled upon a beam, was placed on bearers in front, and the end introduced between the drum and trough, before the thickened colouring matter was poured into it, which soon found its way through the holes in the metal plates to the calico, but did not spread, in consequence of the pressure. When, however, the drum was made to rotate, the calico was drawn along, causing the colour to stream out and form the striped effect. Very perfect work was produced in this manner, but generally in light shades of colour. Sometimes the trough was divided into compartments, which enabled the printer to make several colours on the cloth at one operation.

The Excise duties then levied on calico prints materially retarded the development of the trade, which afterwards migrated to Lancashire and Scotland. The improvement, however, in spinning and weaving cotton, with the introduction of the cylinder machine for printing with engraved rollers, the invention of Mr. Bell, a Scotchman, who first brought it into operation in Lancashire, soon established a new era in the history of calico printing. As these changes materially cheapened the process, competition began to weigh heavily on the London printers, who, in self-defence, were obliged to reduce the wages of their workpeople, and this led to frequent quarrels and turn-outs. The struggle with the country producers lasted some years, and was the primary cause of the decay of the London trade, eventually leading to the gradual disappearance of those printing establishments, which, with few exceptions, have either been removed or appropriated to other manufacturing purposes. The printing of silk handkerchiefs, however, has still its chief seat in the neighbourhood of London. The price of labour having approximated to the wages in the north, the printers of silk handkerchiefs are enabled to struggle successfully against their country competitors, and although many attempts have been made to absorb this trade also, both parties being equally affected as regards the elements of cost, they have, with one or two exceptions, failed.

Although blocks are still used for some simple processes, very great facilities have been given to the production of the more elaborate styles by the introduction of Mr. Applegath's ingenious machine for printing silk handkerchiefs from flat engraved plates. This machine is now in general use for several descriptions of work, particularly madder dyes. He has also invented a beautiful little machine for printing the borders on silk handkerchiefs, called the wheelbarrow machine, from its being worked by the hand round the cloth, which remains stationary. The silk handkerchief trade is also indebted to this gentleman for many other mechanical appliances and inventions, and the improvements in the styles of design may, to some extent, be attributed to his enterprising and encouraging system. Improvements, however, in the different processes, are but trifling as compared with other branches of the trade. The black and red, or madder style, is still performed in the manner described by Pliny; and wax, warmed to a liquid state, is also now generally used to preserve white objects during the operation of dyeing, the wax being afterwards removed by boiling in soap.

The old method of engraving blocks on box-wood for calico printing, was superseded, about seventy years ago, by the process called "coppering," the invention of an Englishman, named Service. This new mode had the advantage of being more expeditious in its execution, more economical in cost, and capable of more delicate detail, besides possessing none of the disadvantages of a wood engraved block, after it has been worn by use. In order to strengthen the objects left in relief upon the printing surface, it was necessary to give them, particularly fine lines and forms, a strong foundation, and for this purpose the incisions with the cutting knife on each side of the design were made in an outward slanting direction, thereby strengthening the minute tracery of the design, and protecting it against the ordinary risk of breakage from carelessness and accident, to which, while in use, these blocks were continually exposed. In proportion, therefore, as the surface became worn, a coarser impression would be given, and in order to restore its original fineness, the expensive process of paring the sides of the objects had frequently to be resorted to. By the new method this objection was entirely obviated. It consisted in forming the figures on the surface of the blocks with pieces of thin sheet metal, which were carved and filed to the fashion and form of the design as traced upon the surface of the block. These pieces of metal were driven into the wood by blows from a light hammer, an incision to receive them being first made by a fine-cutting tool through the traced lines of the design. Their upper surfaces, which, in a finished block, represented the design raised in relief, were, by filing and grinding on a fine-cutting stone, reduced to the true horizontal plane necessary for the production of equal even work. These strips and bits of metal, being of a uniform thickness, did not by wearing increase or vary in the impression they gave; and as by this plan very delicate minute lines and objects could be represented, it was generally adopted by the trade, and the old method for the outline blocks discontinued, except in very coarse work, such as is now in use for printing paper-hangings. The grounding-blocks, however, are still cut or engraved after the old fashion.

As one improvement treads upon another and supersedes its predecessor, so Service's invention was destined, about fifteen years ago, to be put aside by a system of casting printing surfaces in type metal. This plan, although for years rudely practised here and elsewhere, was really first brought to perfection in France and thence introduced into this country. The moulds used for the purpose are made of lime wood, which, in consequence of its tough fibrous nature, is found to be superior to any other description of wood. Service's method of introducing the copper pieces to form the design was continued. The wood used is in square blocks, the surface acted upon being across the grain. On this the design is drawn, without any repeating parts; the pieces of copper, which are about a quarter of an inch wide, are then driven edgeways about one-half their breadth into the wood, in the direction of the grain, to a uniform depth, leaving a portion projecting therefrom, similar in appearance to the old coppered block, but not for the same purpose. Heated metal is then poured upon the projecting pieces of copper, where it remains till cool, and by the natural contraction of the liquid metal, the copper pieces soon become firmly imbedded in it. The heat of the metal being taken up by the pieces of copper, has the effect of loosening them in the wood by slightly contracting the surrounding parts. When the whole is cool, the coppers are found firmly united to the metal, and are easily drawn out of the wood, leaving open spaces in the block, forming the mould, from which many castings in type metal can afterwards be obtained without injury. The only care required in the process is to attend to the size of the castings, which would be affected by the shrinking of the mould if used too quickly after the withdrawal of each casting. The wood must be allowed a sufficient time to cool. When any contraction of the mould occurs, it is easily restored to its original size by placing it in a moist atmosphere. The advantage of this plan over the old system was a saving of the cost of every repetition of the design upon the block or nearly so, which could thus also be increased in size.

This mode of making moulds has been superseded by the introduction of my mould-punching machine, by the use of which still further economy, not only in time, but in cost, has been effected, the calico printer being enabled to cast not only the prints but many of the grounds. This improvement dispenses with the necessity of fashioning fresh pieces of copper for each new mould; the interstices in the wood being made with small steel punches, by the combined action of heat and pressure, the most minute work can be produced. It is general in its application to the details of all designs, which are now executed by it with a degree of simplicity and accuracy unknown in the making of surface blocks. The small steel punches are fixed in the ends of vertical metal heaters, which are constantly exposed to the flames of gas or burning charcoal, and thus communicate heat to the steel punches. The lime wood block is placed with the design drawn upon its upper surface, on a table beneath the heated punches, which are then, by means of a treadle, pressed upon by the workman's foot, brought to bear individually upon the details of the design, and by degrees made to punch and burn out the pattern. As it was necessary that in order to see the progress of the work the workman's face should be very near the heaters, great inconvenience was felt from the heat, which at last I remedied by the use of a thin surrounding chamber or shield, through which a stream of cold water was introduced, thereby removing the annoyance which threatened to be fatal to the invention in consequence of the workmen declining to use it. This invention (the punching machine) is now in general use, particularly in Scotland, where block printing has been driven, by the high price of labour in the southern parts of the United Kingdom, and where hand-printing may be considered to have taken its last stand.

For the purpose of encouraging the method of surface roller printing, I have lately introduced an apparatus for bending the cast plates, which can be accomplished with the greatest exactness, and without injury to the objects in relief, which are curved at the same time. This is effected by the use of a roller placed concentrically in a semi-circular trough of such an increased radius as to leave a space between the two corresponding with the thickness of the plate including the objects in relief. The plate is introduced between the roller and a thin elastic sheet of steel attached to the roller, which enters with the plate at the same speed, bearing externally against the semi-circular trough where the friction takes place. My attention was directed to this improvement, in order to encourage the use of the punching machine, and the adaptation of cast plates to surface roller printing, so as to bring into general use a machine which I had invented and patented in 1849, and which is now successfully applied to the printing of shawls in the neighbourhood of Glasgow.

Shawl printing had not hitherto been regarded as a very important branch of the print trade. Until within the last few years, it was chiefly confined to the production of simple styles and low qualities. The red woollen shawls printed with black designs in borders and centres were much in fashion about forty years ago, and imitations in Turkey red dyed cottons were then extensively manufactured. Attempts were made to introduce chintz styles upon white and light coloured grounds; but from the want of taste in the designs, and the coarse vulgar appearance of the printing, they had an unpleasing effect. Although from time to time the attempt was repeated, printed shawls were generally rejected by the public. Some good subdued effects were obtained by printing the warp before weaving, and shawls thus printed were sold for a few seasons. Latterly, however, the printed shawl trade has received a great impetus, since the introduction of the cheaper process of block-making, to which circumstance alone may be attributed its gradual and increasing importance. The patterns which were formerly of an ordinary class, are now good imitations of the most elaborate cashmere designs. The perfection at which they have arrived, and facility with which they are now printed, have established them as regular articles of commerce.

Many printing establishments in Scotland are now employed entirely in the production of shawls, engaging, probably, more special talent in design than any other style of work. The best and richest goods have been printed by Mr. Swaisland of Crayford, Kent, who has succeeded in producing some of the finest specimens of printing ever seen either in this or any other country. Some of these patterns exhibiting the most tasteful chintz and cashmere designs, require more than a hundred blocks to produce them in full detail. The expense of this, even with the cheapened process of block-making, amounts to a large sum. These goods have been well imitated by the Scotch printers, who, by the aid of the punching machine, now print exact imitations of the richest cashmere styles, produced by hand labour, at a very moderate expense. It is now a greatly increasing trade, both in the home and export markets. The material used is a mixture of wool and cotton, or silk; the colours used are topical, that is, mixed with their mordants before being applied to the cloth, and fixed afterwards by exposure to steam. These colours on wools are permanent, and are now frequently applied by surface rollers. The designs for Cashmere shawls, and imitations of ornamental woven fabrics, are generally composed of minute bars and small pieces of outline, in order to represent as nearly as possible the distinct coloured threads in the weaving. It is necessary when these outlines are printed that they be well dried, before the flat or ground colours are introduced, which would otherwise overwhelm their tiny shapes, and destroy the beauty of the design, which mainly depends on the careful preservation of the outline.

Real perfection in printing by machinery was lost in consequence of the colours following each other so rapidly when wet, a fault which had always given to hand-printed fabrics, such as mousselines-de-laine, &c., a decided preference, as in that slow process the first colours have time to dry before those following are applied. For the purpose of remedying this defect, and so removing the only existing objection to machine printing, I invented a machine which enables printers to produce designs on mixed fabrics in every respect equal to the best productions by hand. For this purpose I employ a drum, of such dimensions that the piece of tissue shall be entirely exposed and fixed round it without the ends overlapping, which are secured in a longitudinal groove left for this purpose. This magnum drum, which is sufficiently long to accommodate several pieces at the same time exposed on its surface, side by side, has on its periphery at one end a ring of carefully adjusted cogs, and attached to the ends of the shafts which actuate the printing rollers are small toothed wheels, corresponding exactly in their diameters with the printing rollers. These are made to work into the ring of cogs, the number of which is an exact multiple of the teeth in the small wheels, so that as often as the drum revolves, the same teeth in the drum and wheels always work together. The usual methods of furnishing the colour to surface rollers were introduced, and the arrangements in that respect were similar to those in ordinary use. The piece being carefully and tightly spread on the drum, remains fixed until all the colours are applied, which is done by the rollers separately, time being allowed for each impression to dry before the next is applied. As the drum is made to accommodate several pieces side by side, the object is effected without any loss of time. One workman at these machines can print as much as ten hand printers. The quality of the printings, as regards the register of the colours, is infinitely superior. Some specimens shown at the French Exhibition were much admired by the jurors. Some useful improvements in the application of short surface rollers, and the mode of applying them, were invented by Mr. James Melville, of the Roebank Print Works, who has united his interest with mine in the invention, which may now be considered a perfect substitute for hand labour.

As regards the many processes now in use for producing the various styles of the present day, it is not my purpose to particularise or describe them; the limits of this paper will not admit of it. Many works treating upon the various processes have been published, amongst which I may mention Dr. Ure's "Dictionary of Arts and Manufactures;" Parnell's "Treatise on Calico Printing;" "The Encyclopædia of Useful Arts;" Professor Persoz's elaborate work on the subject, and Dr. Muspratt's chemical work now issuing from the press. The Philosophical Society of Manchester, has taken up the subject, and a complete history of calico printing will be brought out under its authority. The different sections have been undertaken by gentlemen of well-known experience, and great mechanical, chemical, and artistic skill. The names of Dr. Smith, Messrs. Bennet Woodcroft, E. Schunck, John Graham, and Joseph Locket, are associated with it, in themselves a sufficient guarantee that a valuable work will be produced.

Printing from engraved rollers by the cylinder machine has, in consequence of the great speed with which they deliver their impressions, become the ordinary method for producing cotton prints; and although many block printing machines have been invented, all more or less successful in their application to the peculiar purposes and styles for which they were intended, the cylinder has maintained the preference, and for calico-printing purposes is now almost the only machine employed. The great expense, however, of engraving the copper rollers operated for a considerable time against their general introduction, as most of the engraving was wrought by skilled hand labour. It was not until after the introduction from America of the invention of Mr. Jacob Perkins for transferring and multiplying repetitions of designs of engravings by means of steel dies, that the cheapening of the process enabled the printers to make general use of the cylinder printing machine. Many improvements have from time to time been made on the original cylinder printing machine; from the use of one or two rollers, the number was increased to five and six, and latterly eight, ten, and twelve-coloured machines have been contrived and worked with considerable success.

Most manufacturing processes have, however, some practical difficulties or objections to contend with; one great practical difficulty in printing chintz patterns with many colours from engraved rollers has always existed, and still remains—it is the impoverishing effect which the pressure of the plain surface portions of the engraved rollers are found to produce upon the impressions which precede them in the machine, causing a very serious deterioration of the colour, which is thus taken from the surface of the cloth, where its brilliancy is most required. The existence of this hitherto irremediable objection is admitted by all; the effect of it upon the cloth and colour may be compared to the difference in the colour of common writing, where blotting-paper has been used, and where the ink has had time to dry without its use. In the operation of the cylinder machine a similar effect is produced by the immediate application of one engraved roller after another; the impression of the first roller is thus deprived of a portion of its colour by the pressure thereon of the plain surface of the second roller; the third roller increases this defect on the first, and robs the second; and so on, each succeeding roller helping to destroy the intensity of the colour already deposited. This objection is not so serious where mordants are employed, as they immediately attach themselves to, and are absorbed by, the fibres; even these are frequently reduced to a threadbare appearance, the impressions of the first working rollers being easily distinguished by practised eyes. To obviate this difficulty in many colour machines, the combined use of both engraved and surface rollers has been introduced in the same machine, a series of engraved rollers first giving their impressions, followed by a number of surface rollers round the same drum, to work out the effect of the many colours required to perfect chintz designs.

This defect, however, in the principle of the cylinder machine, is not very detrimental in the general production, and excepting (as already stated) in full chintz styles and superior qualities, the increased value of which entirely depend on the purity and distinctness of their colourings, it is thought to be of but slight importance. The rapidity with which this really beautiful machine turns off, with unerring exactness, piece after piece, its miles of printing per day, is truly wonderful. Although it cannot accomplish the fancy styles of topical printing with that perfection which surface printing effects, yet to the cylinder alone is due the extraordinary cheapness of cotton prints.

Engraved rollers and this machine were first applied to the printing of cotton handkerchiefs by Messrs. Todd and Higginbotham, of Glasgow, whose daily productions at the present time amount to 6,000 dozens per day. Many printers print from 15,000 to 20,000 pieces weekly by the cylinder machine, and the stock of copper rollers required in large establishments, independent of the engravings upon them, is of the value of from fifteen to twenty thousand pounds.

In the year 1846, Mr. Bennet Woodcroft's pneumatic process of printing deoxydised indigo in an artificial atmosphere—an invention which ranks amongst the greatest achievements of chemical science as applied to calico printing—was successfully applied to the cylinder machine by Messrs. Hoyle and Co., of Manchester. It is known that in a gas, such as common coal gas, or in any atmosphere devoid of free oxygen, the deoxydised indigo will remain liquid for a length of time, and only while in this state is capable of being absorbed by the cotton fibre, for as soon as the indigo takes up oxygen, it assumes the blue colour, and becomes insoluble. In order to preserve it in a liquid state after its application to the cloth, Mr. Woodcroft contrived a chamber, filled with coal gas, into which the cloth was passed at once from the machine, and where it remained until the indigo was absorbed. During its movement through the chamber the indigo, remaining liquid, was entirely absorbed by the capillary tubes of the fibre, and thus a depth of shade almost approaching to a black was produced from a colour which, if printed in the ordinary way, would have been little more than an azure blue. The process, too, was completed in much less time than that required for the process ordinarily in use.

Mr. Woodcroft's invention for printing yarns from engraved rollers, patented in 1827, consisted in the application, for the first time, of the engraved rollers; for this purpose the yarns were afterwards separated into hanks, for the purpose of "ageing" the mordant and for the convenience of dyeing with madder. These hanks were afterwards woven into cloth, exhibiting the pattern between alternate stripes of plain coloured yarns. The process was stopped for some months by the Excise officers, who thought these after products ought to pay the same duty as calico prints, but the law officers of the Crown, finding it was not within the terms of the Act of Parliament, but the process was ultimately allowed to proceed. Eventually, this and other circumstances led to the entire removal of the Excise duties on prints.

Shading in stripes has been very successfully performed by the cylinder machine from engraved rollers. This is done by mixing the different tones of colour upon endless sieves, before the colour is applied by them to the roller, which afterwards, by the assistance of the "doctor" on its surface, completes the more perfect gradation and mixture of the tints.

A mode of producing all the pale shades of a design, by the application of one block or roller, was patented by me in the year 1850. It is applicable to either hand or machine printing. The preparation for printing the design is made in the usual way, a roller or block being appropriated to each separate colour, excepting all the pale shades in every part of the design, which are omitted in the "preparation" coloured sketch, as if they were not intended to be there. In this state the design is transferred to the rollers or blocks. The pale shades, which constitute the high lights in every portion of the design, are then added to the "preparation" sketch, and all these high lights or shapes, representing the palest shade of every colour in the design, are then transferred to one roller or block, which is called the "reducer." To produce pale shades and tints of colour, the tones may be reduced by the action of antagonistic chemicals, or by the admixture of solutions of gum, and other similar thickeners, slightly charged with mordants. Thus, the "standard" of any colour is its full strength, and generally produces the darkest shades. By diluting these standards in certain proportions with reducing liquids, almost all the lighter shades are obtained. For example, one part of the standard to 25 or 30 parts of reducing liquid is about the proportionate reduction for the palest shades, which we will call the No. 5 shade of a colour. These No. 5 shades have, in measured quantity, about one-half less of the colouring matter than the No. 4 shades contain; and therefore if the proper quantity of reducing liquid is put upon the cloth, and the No. 4 shade printed upon it, the No. 5 shade is produced; the cloth, being saturated with the reducing liquid, rejects a portion of the colour from the engraving, and an admixture of the two is the result; a due proportion of the fourth shade being retained by the block or roller, and a corresponding proportion of the reducing liquid being retained by the cloth. The reducing of the shades may be effected by the partial destruction of the fourth shade of colour, or by such chemical agents in the reducing liquid as will insure the desired change.

We have now approached the period when the old method of engraving rollers (thought to be so perfect) is about to be superseded by the use of "the pentagraph," by means of which the design, enlarged to five times its intended size, is, by a series of obedient diamonds, etched upon the roller, of the required scale. This new method, the invention of Mr. Cripps, of Manchester, promises to become of general application, and will probably create a revolution in that branch of the trade. I have seen some very beautiful specimens of printing on muslin from rollers engraved by this process, the production of Messrs. James Black and Co., of Glasgow. The outlines were extremely well defined, and the register of the colours and general effect such as to leave but very little margin for further improvement.

The printing of woven carpets is a recent and novel application of the art. In operating on plain velvet pile and terry goods, it is necessary not only to print the surface or end of the pile, but to cover the whole depth of it with colour. The dimensions of the design are generally far beyond the ordinary size of common printing blocks, and the variety of shades of colour required to work them out renders the employment of powerful and accurate machinery a matter of absolute necessity.

The apparatus by which I have succeeded in printing carpets is composed of a series of block-printing machines, firmly joined together at equal distances, by means of connecting shafts and gearing; the whole are actuated in one simultaneous movement, so that the combined efforts of all the machines in the series are employed at the same time upon one piece of carpet and the same design, each printing in different colours. By this arrangement I am enabled to print patterns of large dimensions on pile fabrics, where a too frequent repetition of the design is generally considered detrimental to the effect required. By increasing the number of machines in the series, I can work out large designs in any number of colours, or shades of colour, and produce at a single operation a richness and variety of effect never before accomplished by mechanical contrivances, and with a rapidity and precision not to be equalled by the slow process of block-printing by hand. The carpet is made to enter at one end of the apparatus, and is carried at intervals, by the action of the machine, the exact length of the design. The carpet is carried through the machine by an endless carrying cloth, which is a very important part of the operation, as upon the accurate movement of this cloth the lengthways register of the design entirely depends. It is, therefore, necessary that the carpet, when laid thereon, should be immovable. This is effected by the use of small pin points, which project from the outer surface of the carrying cloth, in which they are fixed. They must be left of a sufficient length to enter the foundation of the carpet, but not to pass through into the pile. It is also necessary that the carrying cloth should move through the machines in a straight, undeviating line, and also that it should stop while the blocks deliver their impressions. This is effected by the use of endless flexible steel bands, attached to the sides of the carrying cloth; and to these bands small studs and rollers are fixed, at suitable distances, which are made to traverse in longitudinal grooves the whole length of the series of machines. At exact distances in the steel bands, there are small holes, which work upon studs placed in the periphery of the entering and delivering drums, placed at each end of the apparatus, and round which the endless carrying-cloth is tightly drawn. By this means a correct advancing movement of the carpet is insured. In printing carpets, two, three, or four repeated impressions of the blocks are sometimes necessary, in order to deposit a sufficient amount of colour to stain the pile to its foundation. By the mechanical action of the machine, the pressure of each succeeding impression can be varied, the first being well forced into the cloth, whilst the last application is placed lightly on the surface, ensuring a more brilliant effect in the finish. Besides the pressure which the machine exerts in depositing the colours on the carpet, other means are adopted for ensuring their sinking to the bottom of the pile. Before the colours are applied to the carpet in the printing machine, it is subjected to the usual process of preparation or mordanting, by passing it through a weak solution of sulpho-muriate of tin, and afterwards through chlorine and sulphuric acid, also diluted to about half a degree above the water float of the hydrometer. This preparing process for topical colours is required in order to fix the colour upon the fibre, which, being well saturated with the mordant, becomes the medium for their chemical combination. After the cloth has been well washed by machinery (a process which does not remove the mordant) it is then wound smoothly round a circular cradle or hydro-extractor, which, by revolving on its axis at a high speed, discharges, by centrifugal action, every loose particle of water from the carpet. It is then in a fit state to be printed. The colour being applied to it in this moistened state (without the excessive pressure which would otherwise be required) sinks evenly to the foundation of the pile; the damp woollen fabric being an excellent conductor for the colour, and being softened by the mordant, absorbs the dye much easier, and with more certainty, than would be the case if the colour was applied in the ordinary manner, after the fabrics are dried.

The enormous pressure upon large flat surfaces, which would otherwise be required to force the colour into the pile, would completely destroy the outline, and create confusion and a general mixture of the tints. The colours are found to be more permanent by adopting this method, and the general effect is softened and improved. The blocks employed for the printing of carpets are of greater dimensions than ordinary blocks. The largest used at present are 56 inches long by 27 inches wide. With eighteen blocks I can, by working two or three colours upon some of them, produce very rich and elaborate styles. These blocks are prepared in the following manner:—The design is transferred to checked or point paper, as designs for weaving are prepared. In like manner the surfaces of the printing-blocks are prepared, by cutting them in lines each way, so as to form checks of a corresponding number of squares all over the surface, each block being made a fac-simile of the others. This is done without any reference to the design. It is then only necessary to mark those squares on each block which represent on the point paper the particular colour in which that block is to work. These squares are afterwards left in relief by removing the intermediate parts. Each block thus carries on its surface certain portions of the design, every coloured square on the point paper being represented by the corresponding square on one or other of the blocks. The colour is not furnished from flat sieves, but from rollers. Each section of the apparatus works with two blocks, which deliver their impressions on one table, taking up their colour in passing to and fro over the colour rollers, as they are moved laterally by the traversing frames, where they are placed on springs, which raise them after they have been forced down upon the carpet by the action of the machine. In the construction of the machinery very great accuracy is necessary to insure correct work. The blocks being distributed in their proper places in couples through the whole series of machines, they deposit their colours upon the carpet with varying pressure, as the carpet is carried through upon the endless cloth, stopping at each length of the design, and receiving the impressions from the different blocks, until it leaves the apparatus with the perfect design upon it, exhibiting each square fitted to the other in precisely the same order and regularity as they are seen represented upon the original transfer. The machine, with the drying apparatus attached, weighs 72 tons, and will print 1,500 yards of carpet in twelve hours. After the carpet is dried it is taken to the steam box, in which it is hung for two hours, and subjected to the action of steam at considerable pressure. This softens the colours and fixes them to the fabric, and is analogous to the boiling operation in the process of dyeing. The carpets are afterwards washed by machinery for two hours, to remove the superfluous parts and the thickening of the colours. They are then dried, dressed, sheared, and finished for the market.

The carpets printed by the apparatus above described, are known in the market as Bright and Co.'s carpets. They are woven by the power loom, Mr. Sievier's invention, which raises the pile without the use of a wire. Carpets thus manufactured, though inferior in some respects to the superior qualities of woven carpets, have the recommendation of cheapness, and, inasmuch as they will wash and clean, without injury to the colours or derangement of the pile, have a decided advantage.

The printing of woollen yarns for carpets, on Mr. Whytock's principle, has grown to an enormous trade; but this portion of the subject has been so recently before the Society, and the process so well explained in Mr. A. Whytock's paper, that I will pass it by.

Printed druggets have been an article of commerce for some years; large quantities have been exported to the United States, and the home consumption is very considerable. They are printed generally with medium size patterns by hand blocks, in from two to six colours, which are fixed by the steaming process. The patterns employed do not generally cover the ground of the drugget, which is mostly left white. Felted cloths have also been printed and used for the same purpose, and to some extent have superseded the druggets, on account of their lower price. Many of them have been printed in the Borough-road, London, by the Felt Company; the remaining portion in Yorkshire. The low qualities of printed Brussels carpets have lately interfered very much with the sale of these goods, and the manufacture in consequence has considerably diminished.

Nothing will tend more to encourage the art of design, as applied to calico printing, than the improvements which have lately taken place in the rapid execution of the blocks and rollers. Formerly it was necessary to commence preparations for a spring trade at the end of the previous summer. The decision then made, as regarded the selection of designs for the ensuing season, was stereotyped, and no chance afterwards would exist for any change or renewal, however unfortunate and unsaleable the patterns might prove. Thus the trade was very speculative, depending on the accident of a style or the caprice of fashion. This early commencement was necessary, not only on account of the time required for the preparation of the blocks, but also in consequence of the old method of bleaching the madder stain from the cloth, which was done by exposure to the atmosphere and to the rays of the sun. Chemistry has now supplied the means of accomplishing the removal of the stains, and has effected changes in those other processes which formerly required weeks to complete. The printer of the present day can change his stock of patterns in a few days. His rollers may be turned off and re-engraved with other patterns by the pentagraph; and the metal blocks melted up, and re-cast into more acceptable designs while the "season is on."

Too much cannot be said in favour of schools of design, or too much done to support and encourage them. Although of comparatively recent origin, their usefulness is already felt in many districts, and their influence will increase. In my opinion, the art of drawing should become a more general branch of education, and should take precedence of many studies which have hitherto, and, I am afraid, are still, too much considered indispensable, and for the attainment of which too much valuable time is thrown away.

The length to which this paper has already run warns me that I must not dwell upon this point, though its importance, both commercially and otherwise, cannot be too much pressed upon our consideration.

The limits of this paper will not permit me to touch upon the chemistry of printing; that is a section of the art I will leave to abler hands. While treating on the subject of shawl and carpet printing, to which this paper has special reference, I have been compelled to speak of some of my own inventions, which are intimately connected with the improvements in both those manufactures.

In the following remarks, I wish to be understood as addressing myself, not to individuals, but to the Manchester and Glasgow printers generally, between whom the race for precedence mainly lies. In my opinion, the Glasgow printers are distancing their competitors. Many circumstances have conspired to convince me of this. If there be any new process or machine, inquire for it at Glasgow; you will not find it in Manchester. Manchester desires no improvements, and is content to jog on in the old track. Glasgow seeks and encourages every novelty. If quantity is wanted, it is to be obtained in Manchester; but if quality and quantity are required, it is becoming necessary to go further north. The de laine trade, the handkerchief trade, the shawl trade, and the muslin trade, are now principally in Glasgow hands, and they do them well. Manchester is dropping behind, and although some talented spirits are still urging on the race, such as the Hoyles, the Hargreaves, the Dugdales, and the Margeresons, Glasgow's energies increase.

Specimens were exhibited of white cloth dried up at its different stages, supplied by Mr. Hall, the manager at the Busby Print Works (Messrs. Inglis and Wakefield); also specimens showing the various stages of the process of printing by the cylinder machine with mordants, and raising with madder dye. Specimens of mousselines-de-laine printed in topical colours, showing the different stages of the process. Specimens of machine printing from engraved rollers in fast colours, raised from cochineal upon acetate of iron and aluminous mordants; of machine printing in topical colours; and of machine printing in madder dyes, by Messrs. James Black and Co., Glasgow. The rollers for the madder dyes were engraved by means of the pentagraph, by Messrs. Stephen and Fulton, Glasgow. Four specimens of fancy summer barèges, muslins in topical colours, printed by hand, by Messrs. Inglis and Wakefield. Specimens of furniture printing by the cylinder, with twelve engraved rollers. Specimens of shawls printed by the magnum drum machine from surface rollers. Specimens of Bright and Co.'s carpets:—1. The white cloth velvet pile and terry; 2. Sample printed, but not steamed; 3. Sample steamed, but not washed; 4. Sample washed and finished. Sample of an old London print, produced in London upwards of one hundred years ago, from wood-engraved blocks. An engraved roller for cylinder printing. A bordering machine, by Mr. Applegath. An old wood-engraved block. A coppered block. A cast type metal block. A mould. A casting bent, as applied to surface rollers. A casting as taken from the mould, with runners attached. A mould with casting, and casting boards before separation. A box of steel punches. A set of carpet-printing blocks.

DISCUSSION.

Mr. P. GRAHAM said, with regard to the machine for printing carpets, invented by Mr. Burch, he would say, having witnessed it in operation, that it was an invention of the greatest talent and ingenuity, and he believed Mr. Burch had the credit of having turned out the first marketable piece of printed carpet. But for that machine, the patent of Sievier, for weaving a pile carpet without the wire, would have been almost valueless. Other inventions for printing carpets had certainly been patented, but he was not aware that any had yet been brought into operation.

The CHAIRMAN having expressed his willingness to give the meeting some information upon the process of shawl printing, &c., called attention to a specimen he exhibited, showing the various stages of printing a pattern of an elaborate character from twelve blocks, progressing from very faint and indistinct colourings, up to the perfected pattern. [These blocks were exhibited.] For filling in the dark ground of the pattern, a thirteenth block was applied. He explained that the number of times the blocks were laid upon a shawl of the pattern exhibited was 820 without the ground-work, and with the coloured ground 1,080 times. When a small filling in the centre was added to the shawl, the blocks were applied no fewer than 1,272 times, including the border and the centre. Two of the shawls exhibited by him, he stated, had 1,600 layings of the blocks to complete the printing of the patterns. This, he said, afforded as familiar an explanation as could be given of the process of printing fabrics, where blocks were employed. With regard to the opinion that block-printing would be superseded, he thought that was quite out of the question; where fine productions were required, the blocks could not be superseded. They had, however, at the present day, managed to unite block and roller printing together, by which means they had got over the difficulty mentioned in the paper, of the first and early colours becoming impoverished through the repeated application of the subsequent rollers. He held in his hand a specimen of barège printed by four rollers and four blocks, by which means the finer colours were not destroyed by the repeated passages over the rollers. That was a specimen of foreign manufacture. He had mentioned that one of the shawls exhibited had received no fewer than 1,600 impressions from the various blocks, and yet the market price of that article was only 21s. 9d. wholesale. Out of that sum there was 9s. for the cloth alone, leaving only 12s. 9d. for the workman's time, the colour, and two profits, those of the manufacturer and the printer. The meeting might therefore judge how quickly the shawls must be printed to enable them to be sold at such a price. He then exhibited other specimens, in which variety was produced by changing the colours employed, the blocks remaining the same. In some cases, there were twelve different arrangements of the same pattern. He also exhibited specimens of type patterns, which were cast from a mould in wood, and were afterwards placed upon blocks of wood of the required height, in the same manner as stereotyped plates were used for letter-press printing. These had been found to be a great improvement upon the wood blocks for the finer descriptions of patterns. He also exhibited some wood blocks engraved a hundred years ago, which, although very fine and intricate in the engraving, were not, he said, to be compared with the productions of the present day. Eighty, or a hundred years ago, a printed fabric was sold as high as 8s. or 10s. per yard, which could be had at the present day for 2s. a yard; therefore, the printers of that period could afford to bestow more time upon the engraving of the blocks than the prices of the present day would admit. The author of the paper, he thought, had said too little about the printing that was carried on in the environs of London. Some of the shawls exhibited were what was called town printed, that is, printed in the suburbs of London, whilst others were printed in Scotland. An inspection would show the fineness of the printing of the former as compared with the others. Possibly, the articles of Glasgow manufacture were of a cheaper description, labour being cheaper in Scotland than in London, added to which it was probable, that more time was devoted to the production of the finer description of goods in London. He would mention another description of goods, to which only a slight allusion was made in the paper, viz., mousselines-de-laine. The patterns on this fabric were formed by what was called compartment printing, by which three are four colours were printed together. The colour sieves were divided into compartments: three or four different colours were put into the sieve at a sufficient distance from each other, and two, three, or four colours were impressed upon the fabric at the same time, at such distances apart as to prevent mingling. The same process had been applied to other printing as well as to woollen with success. (Some beautiful specimens of printed flannel were here exhibited.) The Chairman went on to remark that, compared with the blocks used by Mr. Burch for carpet printing, those used for the finer fabrics would appear extremely small, but in the smallness of the blocks the facility of working consisted, and taking the number of times that the blocks were applied, it was necessary to have them of a convenient size for handling and lifting by the workman. The carpet blocks, however, were only multiplied sizes of those exhibited on the table. (There were also exhibited very beautiful specimens of barège and muslins, richly printed, also specimens of muslin roller printing, in which two and three rollers had been employed, also block printed muslin.) The Chairman remarked that it was impossible to say to what perfection roller printing might be brought, but he considered it doubtful whether it would ever supersede the use of blocks in the printing of the finer fabrics, where richness of colouring was required.

A GENTLEMAN inquired whether roller printing was the cheapest.

The CHAIRMAN replied, that it was cheaper by far. The length of time that a piece of block-printed muslin was in hand varied from one to three months, whereas roller work was generally passed out within a week. The essential of roller work was, that the adjustment should be quite perfect. The roller took up the colours, and the cloth was made to pass under it as quickly as possible. A great many of the finer fabrics exhibited were of foreign manufacture, that of Messrs. Gros, Odier, Roman, and Co., of Wesserling (Haut Rhin), and more time was bestowed upon them than could be afforded in England, on account of labour being so much cheaper in France and Switzerland. The best workman in those countries would not, probably, be paid more than 2s. 6d. per day, whereas a man doing similar work in London would earn 7s. or 8s. There were whole villages in France and Switzerland where nothing else but printing fabrics was done, and one establishment, where the specimens exhibited were printed, employed as many as 5,800 people. In the foreign manufacture quality was regarded rather than quantity, whereas in England, owing to the great demand which existed, the reverse was generally the rule.

Mr. WINKWORTH asked the chairman whether he endorsed the opinion expressed by Mr. Burch, that the manufacturers of Glasgow were outstripping those of Manchester.

The CHAIRMAN.—Most decidedly. He hoped, however, that the Manchester printers would see their error in time to prevent loss of trade.

Mr. WINKWORTH would ask another question, arising out of the chairman's observations. He had spoken of a certain class of shawls and mousselines-de laine as being cheap compared with others; for instance, that the Glasgow printed shawls, &c., were cheaper than those printed in the neighbourhood of London. He wished to ask whether the chairman meant by that to convey that they were precisely the same kind of goods, but because the expenses of production in the neighbourhood of London were higher, they could not be sold at the same price as they could at Glasgow, the expenses being so much less.

The Chairman said, that was not exactly his meaning, longer time being given to the town printing and more skilful hands employed.

Mr. Winkworth.—Then if there was no superiority of workmanship in the neighbourhood of London, they could not carry on any business? Because he should suppose that there must be some characteristic attaching itself to the printing in and about London which made the goods acceptable to the purchaser over and above that which was done at Glasgow.

The Chairman.—What I meant was—if you removed one of the London manufactories to Glasgow, you could produce the same work there. There would be no difficulty whatever in doing so. Supposing, for instance, Mr. Swaisland, having a manufactory in the neighbourhood of London, removed to Glasgow, he would have no more difficulty in producing his work there than in London.

Mr. Winkworth.—How does he sell his goods?

The Chairman.—There is more time given here, and there is not the same necessity for establishments of that description in Glasgow as in London. It is necessary to have your establishment near to where the goods are required; and the daily communication which must be had with the persons who produce these shawls require it, as a matter of necessity, that he should be upon the spot.

Mr. Winkworth thought the Chairman had not made adequate allowance for the means of transit between Glasgow and London which now exist.

The Chairman was quite aware of the facilities of transit which exist at the present day; but, at the same time, it was necessary that the printer and the seller should be in immediate personal intercourse, and no facilities of transit would enable that to be done, because there might be twenty or thirty trials before the shawl was produced in saleable colours; and, if they had to send to Glasgow, a season might expire before the arrangements were completed.

Mr. Winkworth.—Then, the result of the whole matter is—that Mr. Swaisland, and other town printers, having all the advantages of immediate intercourse with the designer and the buyer, do, after all, produce the best articles?

The Chairman.—Articles similar to these.

Mr. Winkworth.—I want to arrive at this—that, after all, the work produced in and about London is a more finished article than that produced at Glasgow.

The Chairman.—Decidedly.

Mr. Winkworth.—Then, although it is produced at Glasgow at a lower figure, it does not follow that it is a cheap article, because it is at a lower price?

The Chairman.—Certainly not.

Mr. Winkworth.—Because you made use of the word "cheap;" but I thought you meant a lower price article, because it was inferior in design.

The Chairman.—It is produced more quickly, and consequently not so carefully finished.

Mr. Hanhart had heard with pleasure the compliment which had been paid in the paper to his native place. He attributed a great deal of the excellence that had been attained there in this description of manufactures, to the practical education that was imparted to those who were engaged in this particular trade. The greatest facilities were given for evening instruction in drawing, and also in the science of chemistry, which was so intimately connected with this branch of manufactures. He was happy to number amongst his personal friends several of the first designers of the present day. He attributed the excellence which had been attained to the facilities for acquiring, and the encouragement given, to those who obtained the practical education spoken of.

Mr. Lavanchy had hoped that some one connected with the printing department of Mr. Swaisland's establishment would have been present to afford some information on this subject. It was true that Glasgow had turned out some very beautiful patterns of printing, but he believed the great superiority of Mr. Swaisland's goods consisted in the fact, that a clear outline was given to almost every colour. To accomplish this double blocks were required. The fabrics of Mr. Swaisland were, by these means, made to approach more nearly than any others to the woollen fabrics, from the fact that each colour possessed a clear outline.

A vote of thanks having been passed to Mr. Burch for his interesting paper,

The Secretary announced that the Paper to be read at the meeting of Wednesday next, the 7th instant, was "Fires: the Best Means of Preventing and Arresting them, with a Few Words on Fire-proof Structures," by Mr. Jas. Braidwood, Superintendent of the London Fire Brigade. On this evening John Thwaites, Esq., Chairman of the Metropolitan Board of Works, will preside.

EXAMINATION OF CLASSES IN INSTITUTES.

Sir John William Ramsden, Bart., M.P., gives a Prize of Ten Guineas to be awarded to the candidate who shall pass the best examination in English Literature, English Composition, and Writing from Dictation, and obtain a first-class certificate therein.

The Society's Examiners for "Free-hand Drawing in Outline from Objects," name, as a Text-book on this subject, Rudimentary Art Instruction for Artizans and others, and for Schools, prepared at the request of the Society of Arts, Manufactures, and Commerce—Free-hand Outline, Part I.; Free-hand Outline, Part II. Bell and Daldy.

The following letter, enclosing five pounds, has been received by the Council, for which they beg to offer their best thanks:—

April 24, 1855.

Sir,—I beg to offer, subject to the approval of the Council, five pounds towards defraying one day's expenses in London for ten young men from the country, should there be any candidates at the coming examinations disposed to accept a trifle from

A FRIEND.

To the Secretary of the Society of Arts.

The Council have directed inquiries to be made for the purpose of enabling them to furnish information to candidates in reference to suitable board and lodging during their stay in London.

RATING OF INSTITUTES.

In compliance with the desire expressed at the Conference of Representatives from Institutions in Union held last July, the Council have had prepared with the advice of the Committee to whom the subject has been referred, the subjoined Bill, which is about to be introduced into the House of Commons. Any suggestion for its improvement may be sent to the Secretary to the Society of Arts.

AN ACT TO AMEND AN ACT TO EXEMPT FROM COUNTY, BOROUGH, PAROCHIAL, AND OTHER LOCAL RATES, LAND AND BUILDINGS OCCUPIED BY SCIENTIFIC OR LITERARY INSTITUTIONS.

Whereas, by an Act passed in the sixth and seventh years of the reign of her present Majesty, it was enacted that, "from and after the 1st day of October, 1843, no person or persons shall be assessed, or rated, or liable to be assessed or rated, or liable to pay to any county, borough, parochial, or other local rates or cesses, in respect of any lands, houses, or buildings, belonging to any Society instituted for purposes of science, literature, or fine arts exclusively, either as tenant or owner, and occupied by it for the transaction of its business, and for carrying into effect its purposes; provided that such Society should be supported, wholly, or in part, by annual voluntary contributions, and should not, and by its laws might not, make any dividend, gift, division, or bonus in money, unto or between any of its members; and provided also that such Society should obtain the certificate of the barrister-at-law, or lord advocate, as thereinafter mentioned."

And, whereas it is expedient to amend the said statute, be it therefore enacted as follows:—

From and after the 1st day of January, 1857, the aforesaid provision, as also the whole of Section 6 of the said statute, shall be repealed.

On and after the 1st day of January, 1857, no person or persons shall be assessed or rated, or liable to pay to any county, borough, parochial, or other local rates or cesses, in respect of any lands, houses, or buildings, or parts of houses or buildings, belonging to any Society instituted for purposes of science, literature, or the fine arts, either as tenant or as owner, and occupied by it for the transaction of its business, and for carrying into effect its purposes; provided that such Society shall be supported, wholly or in part, by annual voluntary contributions, and shall not, and by its laws may not, make any dividend, gift, division, or bonus in money, unto or between any of its members; and provided also that such Society shall obtain the certificate of the barrister-at-law or lord advocate, as mentioned in the said statute.

Whenever any such Society shall have obtained the certificate of the barrister-at-law or lord advocate, and the laws, rules, and regulations of the Society shall have been allowed and confirmed by the recorder of any borough sessions, or the justices at any general quarter sessions, or if such certificate of the barrister-at-law or lord advocate shall be refused; but such recorder or justices, on such laws, rules, and regulations being submitted to them respectively, shall order the same to be filed, notwithstanding such refusal, then it shall not be lawful thereafter to assess or rate any person or persons, nor shall any person or persons be liable to be assessed or rated, or liable to pay to any county, borough, parochial, or other local rates or cesses, in respect of any land, houses, or buildings, or parts of houses or buildings, belonging to any such Society as aforesaid; and any such assessment or rate, if made, shall be wholly void, and no person or persons assessed to any rate from which any Society shall be exempted by this Act shall have any appeal, or right to appeal, against such certificate, or against such allowance, or confirmation, or filing of the laws, rules, and regulations, as aforesaid. Provided, nevertheless, that if at any time the laws, rules, and regulations of any such Society shall be altered or varied, or if any such Society shall be conducted for purposes different from those set forth in the laws, rules, and regulations, after the same shall have been allowed and confirmed, or filed, the exemption from rates and cesses herein contained shall cease. But nothing herein contained shall prevent any such Society from applying for a fresh certificate, or from applying to have its laws, rules, and regulations again allowed and confirmed, or filed, as often as need be.

COMMERCIAL MUSEUM IN LIVERPOOL.

When the Liverpool Collection of Imports was returned after the Great Exhibition of 1851, it was presented to the Town (or Derby) Museum, then forming in connection with the Free Public Library. It was conceived that it might be made the nucleus of a local Trade Museum, and that, by an expenditure of under £200 per annum, it might be arranged and extended. The Committee, however, opposed the outlay, as useless. But the Directors of the Royal Institution, seeing the great want of a Commercial Museum in so important a port as Liverpool, have determined to endeavour to supply it. They have converted the spacious Gymnasium into a Museum, capable of receiving a large collection, which it is intended to arrange after the plans adopted at Kew, at the Museum of Practical Geology in London, and the Trade Museum of Animal Products founded by the Society of Arts. Mural and table cases, of upwards of one thousand superficial feet in extent, have been provided for the reception of botanical specimens and vegetable products alone. The animal and mineral departments are not yet commenced. There is also a large open space down the centre, in which it is hoped that spirited firms and individuals will find it to their interest to place groups or trophies of their manufactures. A large wall space is provided for contributions of botanical plates and drawings. A dwelling has been erected for a Curator.

It is intended that the collection, when formed, shall be made available, as far as possible, to the public.

As its success will, in a great measure depend upon contributions of specimens from private individuals, active steps are being taken to secure the necessary co-operation. In the meantime, it may be usful to point out that specimens of manufactures from vegetable substances, and vegetable products used in manufactures, are particularly desired. They should be forwarded, addressed to Mr. T. C. Archer, the Honorary Director of the Museum.

Home Correspondence.

REMARKS ON MR. BENNOCH'S PAPER ON FIBRE GILDING.

SIR,—In the able paper read by Mr. Bennoch, at the Society of Arts, on the 16th inst., on "Thread and Fibre Gilding," I cannot but regret that that gentleman should have passed so summarily over the origin of fibre gilding in this country. In the prefatory remarks to that portion of the paper relating to fibre gilding, Mr. Bennoch observes—"For many years chemists have attempted every known method of gilding, in the hope of discovering some process by which silk, or other fibre, could be gilded without applying the immense labour seen to be necessary before a thread with a covering of gold can be used with facility in the loom, and woven into cloth—*but they always failed.* In France, where scientific research is liberally promoted by the Government, a large reward was offered for a successful plan, but no man ever had the opportunity or satisfaction of claiming it." In the next paragraph, Mr. Bennoch states that, "among the several investigators was Mr. Albert Hock, who, failing to find in chemistry the principle by which fibres could be gilded, succeeded by means of a simple mechanical contrivance."

Now, although unacquainted with the fact that the French Government had offered a reward for a successful plan to gild fibres, I would beg to state that for the past five years my attention has been devoted to this important subject; and in May, 1853, a patent was granted to me for the invention of fibre gilding, as also for covering threads with ultramarine, emerald green, and other colours' in a state of powder. As Mr. Bennoch has not stated when Mr. Hock commenced his investigations in the matter of fibre gilding, or when he obtained the results upon which was based the patent afterwards granted to Mr. Bennoch in this country, it would perhaps be premature for me to say to whom the credit of the invention of fibre gilding belongs—to Mr. Hock or myself. As, however, my patent is dated seven months prior to that of Mr. Bennoch, I may assume—in the absence of proof to the contrary—that the invention, as well as the *right to practice* the same, belongs to me.

As economy in the cost of production is an important feature in any invention intended to meet the wants of 150 millions of people, I, in the first place, devoted my attention chiefly to the employment of metallic powder for the accomplishment of the desired object, by means of which I had the satisfaction of producing, not only a bright metallic, or partially metallic, thread, but also a very near imitation of silk. In the course of my investigations, however, I employed metal leaf, gold leaf, brocade or fragments of leaf, metallic solutions or compositions, and the electro-plating process; and in my patent I specified and claimed these several methods of fibre gilding.

When metallic powder is employed, the mode of operation is as follows:—The thread or fibre to be prepared is first dyed in the usual way, and is then placed upon a swift or reel, from which it may be made to pass through the flame of a gas-burner, if so desired, in order to remove all the loose filaments projecting from its surface. It is then passed under a roller, or rollers, working in a trough containing a flexible, transparent, and adhesive composition. It then passes between pads of leather or india-rubber, where it is pressed lightly, so as to remove any superfluous size or gum, and to equalise the same. It then passes over or between rollers covered with fustian or other soft material, and revolving in a trough containing the powder, by which means the fibres are perfectly coated with a very thin layer of metal. It then passes on to spools or reels, to which a slow horizontal motion is communicated by means of a screw or threaded spindle, for the purpose of causing the threads to lay evenly side by side. A tremulous motion may be communicated to the reels on to which the fibres are thus wound, or they may be brought into contact with a brush, for the purpose of removing any superfluous powder; and, when so desired, a current of hot air is forced thereon, for the purpose of drying it. In some cases, the metallic powder is mixed with a glutinous matter, and applied as before described. Also, in some cases, the fibres may be only partially covered. When metallic solutions or compositions are employed, black lead, or other cheap metallic powder may be used in lieu of bronze, and a gilt or silvered surface then produced by the electro-plating process. Whichever mode of gilding the fibres may be employed, a bright metallic lustre is afterwards imparted to the metal by passing the fibres over or between highly-polished steel or other surfaces, or rollers, either cold or heated.

When greater brilliancy is required than can be obtained by the use of metallic powders or solutions, I use, in lieu thereof, gold leaf, metal leaf, or fragments of leaf; the leaf being applied to the fibre by hand, after the glutinous matter, in any convenient manner.

The immense importance of a cheap and efficient method of fibre gilding, both in a commercial and national point of view, must be my apology for troubling you with these further particulars on the subject.

I have, &c.,

WILLIAM GREEN.

57, York-street, City-road, London, April 19, 1856.

MATERIALS FOR KNIFE-HANDLES.

Sir,—It appears that the want of materials for knife-handles is a frequent drawback, I therefore beg to suggest the use of Reaumur's porcelain for this purpose. It appears from the memoir of the late General Bentham, that he had made crucibles of this material, so insensible to heat, as to bear, when red hot, to be plunged into cold water without breaking; and in his letters he indicates this composition as suitable for knife handles. Its cheapness would, moreover, be a recommendation.

Yours truly,

M. S. BENTHAM.

Proceedings of Institutions.

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Bedford.—On the evenings of the 14th and 15th April, Mr. George Dawson, A.M., of Birmingham, gave two lectures in the Assembly Room; the first on "John Bunyan," the second on "Beau Brummell." The character of the "glorious dreamer" was admirably drawn, and not less cleverly that of the renowned "king of fashion." Placed in contrast, their lives were deeply interesting, and excellent lessons were educed. The audiences were numerous, and cordial thanks were voted to Mr. Dawson for his lectures. The chair was occupied on the first evening by Mr. Wm. Blower, and on the second by Dr. T. H. Barker, Vice-Presidents of the Institution.

Brighton.—The half-yearly report of the London, Brighton, and South-Coast Railway Literary and Scientific Institution states that, since the last report, the number of members had increased from 261 to 563 at the expiration of the first quarter, and at the close of the half-year to 449, out of which number 33 became yearly members. The committee recommend that the Saturday evening concerts, which have been most attractive during the winter, should be continued throughout the summer season. During the half-year considerable additions were made to the library; and the several classes in connexion with the Institution have been creditably attended. The balance-sheet shows that the receipts proper to the half-year were £148 3s. 10¾d., the expenditure £145 8s. 1d., leaving a balance in favour of the Institution of £2 15s. 9¾d., in addition to a balance of £11 8s. 10½d. brought forward from the last report.

Poole.—The conversazione of the Literary and Scientific Institution was held on Monday evening, the 21st of April. The chair was taken by Admiral Browne, of Parkstone. Letters of apology were read from Colonel Waugh, who was to have presided, and from the Hon. and Rev. S. G. Osborne, who said that he regarded these institutions at the present moment as of the greatest national value. Brief addresses having been made by the Chairman, the Rev. E. R. Conder, and Mr. Penney (the honorary secretary), the Chairman called upon Mr. Budden to read the first paper "On Clay and its Products." After speaking of the composition of clay, and of the metal aluminium, Mr. Budden went on to describe particularly the Poole clay. He stated that "large quantities of this clay are sent by sea and rail to the Staffordshire and Vauxhall potteries to be made into articles of domestic and other uses, and to form the finest porcelain, while a considerable quantity is expended in the manufacture of alum. It has long been a subject of regret that Poole, while possessing in such an eminent degree the elements of great manufacturing and commercial prosperity, should have been wanting in men capable of developing her resources; but the many beautiful specimens now contributed of the manufactures of Poole and its neighbourhood sufficiently indicate the advent of a new era in the commercial history of the town." Mr. Budden's remarks were illustrated by specimens of the new metal aluminium, lent by Professor T. Redwood, of the Pharmaceutical Society; also numerous articles from the Branksea Pottery, including some beautiful terra cotta figures; and statuettes from the Bruce Pottery. There were likewise two cases from the Architectural Pottery, at Hamworthy, containing a large assortment of their newly patented glazed and coloured bricks, with several cases of richly designed paving tiles. The object of this company, Mr. Budden observed, was not only to produce a brick of superior quality, but by the employment of various glazes and veneers to form a building material cqual in smoothness and beauty to tinted glass or the finest porcelain, to enable us to construct a palace that would bid defiance to the influence of our humid and smoke-corrupted atmosphere, to keep the purest white for ever white, to preserve unsullied the most refined gold, and to banish red brick from the face of our architecture.—Mr. E. Kemp Welch then read an interesting paper on "Steam and its History," which concluded with the words, "that the first modern engine was Watt's, a Scotsman; the first modern locomotive was Trevethick's, an Englishman; and the first modern steam boat was that of Symington, a Scotsman. The American, Fulton, constructed the first regular river steamer, and the first ocean steam voyage was made by Bell, a Scottish engineer."—The third paper was entitled "The History and Chemistry of Photography," by Mr. W. Penney, in which he gave a brief account of the early experimenters in this art, and described the daguerreotype, calotype, and collodion processes. The paper was illustrated by numerous specimens, and among them a daguerreotype, by Mr. W. Thompson, of the bottom of the sea in Weymouth Bay, at a depth of three fathoms. In it might be recognised the rocks, sea-weeds, and the water-line. In conclusion, he said, this new application of photography might add greatly to our knowledge of the wonders of our sea-covered shores, increase our acquaintance with marine animals and plants, and show the structure of rocks, sands, and alluvial deposits under the sea, as yet unexplored.—The rooms were well filled with various other objects of interest, including Dr. Auzoux's anatomical figures, stereoscopes, stuffed birds, marine shells, &c. Between the reading of Mr. Welch's and Mr. Penney's paper, the company were gratified with a selection of music. The conversazione was well attended, and the discussion which ensued on subjects suggested by articles exhibited in the hall, was highly interesting. The hall was reopened again on Tuesday and Wednesday, and the Exhibition was visited by many persons who were unable to attend on Monday evening.

WIRKSWORTH.—On Thursday, the 3rd ult., an interesting lecture was delivered in the Grammar School, by the Rev. J. Edwards, M.A., Vicar of Barron on Trent, on "Binocular Vision as illustrated by the Stereoscope." As preliminary to the remarks and explanations he wished to give, the lecturer sent round the room a few specimens of beautiful stereoscopic portraits, so as thereby to enlist the sympathy and attention of the audience. He then proceeded, by a series of diagrams and models, to explain the principles of binocular, as distinguished from monocular vision; referring extensively to the valuable papers on the subject by Professor Wheatstone, in the Philosophical Transactions. A model, representing the aspect of a skeleton cube to each eye, very much facilitated the development of the principle, and, starting from this point, the audience appeared with readiness and facility to comprehend the effects resulting from the same principle, in the case not only of more complicated geometrical figures, but of the groupings of portraits and of the varied landscape effects. These principles were developed and explained at some length, and the lecture appropriately closed with a careful and well-illustrated description of the Pseudoscope. The correlation of the two instruments was placed in strong contrast; and the attempt was not unsuccessful, by which the lecturer endeavoured to prove how nature may be made, in may instances, to discover her most mysterious agencies. The lecture, which was longer than usual, was listened to by a patient and attentive audience, to many of whom it was well suggested, from the topic of the evening, how, in others of the great operations of nature, they might be successful in discovering her laws and processes by a patient, thoughtful, and untiring investigation of the wonders with which the goodness of God has on every hand surrounded them. The rev. gentleman attended at the Institution to exhibit the beautiful portraits and landscapes on the following evening.

MEETINGS FOR THE ENSUING WEEK.

MON. Royal Inst., 2, General Monthly Meeting.
Architects, 8, Anniversary.
Chemical, 8.
Entomological, 8.
TUES. Royal Inst., 3, Mr. T. A. Malone, "On Photography."
Civil Engineers, 8, Mr. J. Murray, "On the Progressive Construction of Sunderland Dock."
Linnæan, 8.
Pathological, 8.
WED. London Inst., 3, Prof. Rymer Jones, "On Entomology and the General Organisation and Metamorphoses of Insects."
Society of Arts, 8, Mr. James Braidwood, "Fires; the Best Means of Preventing and Arresting them, with a Few Words on Fire-proof Structures."
Geological, 8, I. Dr. J. G. Croker, "On the Lignites of Bovey Tracey, Devonshire." II. Mr. C. J. F. Bunbury, "On the Appearances observed on Draining a Mere near Wretham Hall, Norfolk." III. Mr. J. C. Moore, "On the Silurian Rocks of Wigtonshire." IV. "Mr. E. W. Binney, "On a Fossil Track in the Millstone Grit of Tintwhistle, Cheshire."
THURS. Royal Inst., 3, Prof. Tyndall, "On Light."
Antiquaries, 8.
Royal, 8½.
FRI. Astronomical, 8.
Philological, 8.
Royal Inst., 8½, Mr. Henry Bradbury, "On the Manufacture and Security of Bank Notes," with Photographic and Microscopic Illustrations.
SAT. Royal Inst., 3, "Dr. Hofmann, "On the Non-Metallic Elements, their Manufacture and Application."
Royal Botanic, 3¾.
Medical, 8.

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Delivered on the 22nd and 24th April, 1856.

Par. No.
112. Superannuation (Public Offices)—Account (a corrected sheet).
107. Harbours of Refuge—Detailed Statement.
148. Troops in Turkey—Returns of the Pay and Allowances.
155. Brewers—Return.
105. Bills—National Gallery.
43. Bills—Tenant Right (Ireland).
90. Bills—Factories (amended).
Turnpike Trusts—Third and Fourth Reports by the Secretary of State.

SESSION 1854-55.

449. Scutari, &c., Hospitals—Copy of Official Reports.

Delivered on 25th April, 1856.

156. Hydrographical Survey (Scotland)—Return.
169. National Debt—Account.

PATENT LAW AMENDMENT ACT, 1852.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette April 25th*, 1856.]

Dated 5th April, 1856.

821. James Jones, Warrington—Improvements in railway chairs, and in the method of securing the rails to the same.
822. James Hogg, South Blacket-place, and John Napier, East Sciennes-street, Edinburgh—Improvements in stereotyping.
823. Obed Blake, Thames Plate Glass Works, Blackwall—Improvements in the manufacture of glass.
824. Benjamin Kisch, Kennington—Apparatus for containing an arrangement of cards or papers for selection. (A communication.)
825. James Webster, Birmingham—Improved elastic metallic tube, and the method of manufacturing the same.
826. Thomas Reeves Whitehead, Manchester—Improvements in garments or apparatus to be used for sustaining the human body in water, or for acquiring the art of swimming.
827. Julian Bernard, Albany, Piccadilly—Improvements in machinery or apparatus employed for manufacturing or making boots and shoes, or other coverings for the feet.
828. Edward Martin, Oxford—Improved leg-guard.
829. Henry Thomas Sturley, Church-street, South Lynn—Improved compound or breakfast mixture.

830. Arnold Morton, Wakefield—Improvements in the manufacture of paints and pigments.
831. William Porter Maddison, Barnsley—Improved telegraph or apparatus for the transmission of signals.
832. William Henry Moore, Wenlock-place, City-road—Improvement in the manufacture of candles.
833. Frederick George Underhay, 13, Well's-street, Gray's-inn-road—Improvements in apparatus for drawing off water.
834. Henry Craigie, Edinburgh—Improvements in heating apartments where gas and water are used.
835. Joseph Betteley, Liverpool—Improvements in the manufacture of iron for knees for ships or other purposes.

Dated 7th April, 1856.

837. Jacob Smith, 9, Union-court, Old Broad-street, John Luntley, 3, New Broad-street court—Treating the sunflower plant to render its fibres applicable to the manufacture of textile fabrics, paper, yarn, cordage, &c.
838. John Leigh, Manchester—The use or application of a certain substance or substances in the sizing, stiffening, or otherwise preparing cotton, linen, or other yarns and woven fabrics.
839. Ephraim Morris, Bergen, U.S.—Improved machinery for raising and lowering weights.
840. William Edward Newton, 66, Chancery-lane—Improved construction of furnace for the manufacture of glass. (A communication.)
841. Charles Durand Gardissal, 10, Bedford-street, Strand—Preparing various resins and combining them with oils and fatty matters for manufacturing candles thereof. (A communication.)
842. Arnold Morton, Wakefield—Improvements in the manufacture of paper hangings for decorative purposes.
843. William Terry, Birmingham—Improvements in breech-loading fire arms.
844. William Coles Fuller, 2, Bucklersbury, Cheapside—Improvements in constructing and adapting india-rubber as tyres for wheels.
845. John Adams, 11, Grosvenor-street, Belgrave-gate, Leicester—Improvements in knitting machinery.
846. William Henry Gauntlett, South Bank Iron Works, Eston Junction, near Middlesbro'-on-Tees—Improvements in thermometric apparatus.
847. John Graves, London, and William Frederick Henson, Hampstead—Improvements in lubricating carriage and other axles.

Dated 8th April, 1856.

848. Stephen Johnson Gold, Newhaven, U.S.—Improvement in apparatus for warming buildings by steam.
849. John Carrick Bowser, Queen's terrace, St. John's-wood—Improvements in glove fastenings.
850. Alexander Charles Louis Devaux, King William-street, City—Improvements in the construction and the fitting up of granaries.
851. William Edward Newton, 66, Chancery-lane—Improvements in the process of manufacturing steel, and carbonizing iron and the ores thereof in the said manufacture. (A communication.)
852. William Joseph Curtis, 1, Sebbon-street, Islington—Improvement in lubricating the axles of locomotive engines and of carriages on railways.
853. James Allen Ransome and George Arthur Biddell, Ipswich—Improvements in the manufacture of railway bars and flanch bearers of railway crossings.
854. John Brooke, 10, Crescent, Jewin-street—Improvements in lift pumps.

Dated 9th April, 1856.

855. John Gedge, 4, Wellington-street South, Strand—Improvements in the treatment or preparation of leather, and in the manufacture of articles composed thereof. (A communication.)
856. Joseph Robert Whitgreave, Rugeley—Improvements in the arrangement and construction of locomotive engines.
857. Henry Laxton, 19, Arundel-street, Strand—Improved apparatus for increasing the buoyancy of ships and other vessels. (A communication.)
859. John Armour, Kirkton Bleach Works, Renfrew—Improvements in bleaching textile fabrics and materials.
860. George Frederick Morrell, Fleet street—Improvements in the manufacture of railway chairs.

Dated 10th April, 1856.

861. Henry Laxton, 19, Arundel street, Strand—Improved mode of adjusting circular saws. (A communication.)
863. Alfred Vincent Newton, 66, Chancery-lane—Improvements in the means of attaching together or securing sheets and pieces of paper or manuscript documents. (A communication.)
864. Walter Hall, Erith—A method of stopping or retarding the way of ships and vessels, in order to prevent collisions and otherwise.
865. George Homfray, Ruabon—Improvement in furnaces.

Dated 11th April, 1856.

867. Thomas Williams Makin, Longsight, near Manchester, and John Barnsley, Stockport—Improvements in machinery or apparatus for embossing moiré antique water on all kinds of woven fabrics.
869. James Burnside, 43, Henry-street, Sunderland—Improvements in apparatus for propelling and steering ships and boats.
871. George Jackson, Bilston—Improved steam-boiler, to be heated by the waste heat of puddling or mill furnaces.
873. Antoine Perpigna, Paris—Improvements in the manufacture of coke. (A communication.)

Dated 12th April, 1856.

875. Ludwig Schultz, Green-street, Stepney—Improvements in obtaining photographic pictures upon paper, glass, metal plates, and other fibrous substances.
877. William Bragg Flint, Birmingham—Improvements in fasteners for shutters, windows, doors, and such like purposes, and which said fastening is also applicable to the coupling of railway carriages and trucks, and other useful purposes.
879. Robert Baird Lindsay, Mill Wall Brewery, Poplar—Improvement in romoving the scale or deposit from tubular flues of steam boilers.

Dated 14th April, 1856.

881. George Braden and Charles Braden, Sharp's-alley—Improvements in the manufacture of show tablets for advertising purposes.
883. John Symonds and Thomas Mara Fell, Sufferance Wharf, Millwall, Poplar—Improvements in the reduction of gold, silver, and other ores.
885. George Davies, 1, Serle-street, Lincoln's-inn—Improvements in the method of soldering or uniting cast iron. (A communication.)
887. Jesse Bridgwood, Burslem—Improvement in the manufacture of china and earthenware plug wash-hand basins. (A communication.)
889. Samuel Cunliffe Lister, Bradford—Improvements in spinning.
891. Samuel Cunliffe Lister, Bradford—Improvements in weaving.
893. Alfred Vincent Newton, 66, Chancery lane—Improved machinery for felting hat bodies. (A communication.)

WEEKLY LIST OF PATENTS SEALED.

Sealed April 25th, 1856.

2398. Henry Wyatt.
2406. John James Speed, jun.
2414. William Hartley.
2431. Richard Pannell Forlong.
2437. George Milner.
2447. Isham Biggs and Henry Forfar Osman.
2466. William Gardner.
2476. Francis Hawkes, sen.
2502. William Kenworthy.
2552. Julius Homan.
2553. John Wilkinson, sen., and John Wilkinson, jun.
2562. Thomas Skinner.
2567. Charles Goodyear.
2578. William Lea.
2612. Alfred Vincent Newton.
2620. Oliver Maggs.
2622. Coleman Defries.
2694. William Irlam.
2736. William Beatson.
2739. William Henry Smith.
2815. Alphonse Louis Poitevin.
2816. Alphonse Louis Poitevin.
358. George Tomlinson Bousfield.
388. Charles Cowper.
450. James Diment.
496. Isaac Reckitt, George Reckitt, and Francis Reckitt.
540. James Wallace, jun.

Sealed April 29th, 1856.

2413. Germain Jean Paul Marie Villeroux.
2417. Paul Emile Chappuis.
2424. Robert Griffiths.
2435. Henry Laxton.
2440. John Pinches.
2450. John Patterson.
2458. James Eastwood.
2460. George Davis.
2462. William Robertson and James Henry.
2474. John Hicks.
2506. John Wakefield.
2519. Cullen Whipple.
2643 John Henry Hutchinson.
2679. John Henry Johnson.
2711. Sir Charles Edward Grey.
2719. William Rowan.
87. William Smith.
203. John Beads.
233. Henry Samuel King.
301. Edwin Clark.
325. Thomas Frederick Tyerman.
369. William Edward Newton.
371. Alfred Vincent Newton.
386. William Watson Hewitson.
405. Alfred Vincent Newton.
419. Charles Scott Jackson, Lt. R.N.
460. Edward Schischkar.

PATENTS ON WHICH THE THIRD YEAR'S STAMP DUTY HAS BEEN PAID.

April 21st.

989. Charles Léon Desbordes.
1131. Conrad William Finzel.

April 22nd.

1027. Alfred George Anderson and John Barker Anderson.

April 23rd.

984. James Napier.
1005. William Johnson.
1023. William Reid.

April 24th.

1030. Edward Bird.

April 25th.

1029. John Hetherington.
1130. William Boggett and George Brooks Pettit.

April 26th.

1034. Sir John Scott Lillie, C.B

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

No. in the Register	Date of Registration.	Title.	Proprietors' Name.	Address.
3830	April 17.	Parts of a Gas Governor	William Sugg	19, Marsham-street, Westminster.
3831	April 17.	Part of a Vesuvian Case or Box	J. Palmer and Son	Camberwell.
3832	April 29.	Thompson's Pocket Protector	Robert Thompson	De Beauvoir Town.